IEC Quality Assessment System, IECQ

Rules of procedure –
Part 3-3: IECQ approved component products, related materials & assemblies scheme – IECQ Approved Component – Capability Certification (IECQ AC-C)
IECQ PUBLICATION

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FOREWORD

This publication has been prepared by the Management Committee (MC) of the IECQ.

This publication is related to the IECQ System management Basic Rules contained in publications (IEC CA 01 + IECQ 01-S), IEC Conformity Assessment Systems – Basic Rules (IEC CA 01) plus the IECQ Supplement (IECQ 01-S).

This part IECQ 03-3-3 sets out the requirements for IECQ Approved Component – Capability Certification previously contained in IECQ 03-3 Annex D.

Edition 1.1 of IECQ 03-3-3 is an administrative update to the IECQ title.

The text of this publication is based on the following documents:

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Full information on the approval by the MC of this publication can be found in the report indicated in the above table.
INTRODUCTION

In support of the previously operated scheme Capability Approval the following section has been provided to highlight the particular requirements for its implementation under this IECQ Approved Component Scheme of the IECQ System as IECQ Approved Component – Capability Certification.

Capability Certification is a method of certifying a complete range or family of components within a given technology. This is achieved by testing the parametric limits or boundaries within the given technology. The boundaries are derived from the governing specification(s) or standard(s) or from customer specific requirements. It extends the existing suite of IECQ certification concepts by adding the following principles as mandatory aspects of Capability Certification:

- the foundation of Capability Certification is a formal system for quality management, within the organization. The use of the ‘Capability Manual’ is key to the control the processes involved for both attainment and maintenance of certification to the scope of Capability as defined and verified by the IECQ CB.
- the use of in-process control methods (of which Statistical Process Control (SPC) is an example) together with other quality control attributes is encouraged.
- continuous quality improvement strategy and its demonstration;
- monitoring the overall operations associated with the design and manufacturing processes as well as the components themselves;
- component flexibility due to the certification being based on a company’s own declared boundaries of capability rather than specific standards or specifications allows customer specific components to be accommodated within the certification;
- the acceptance of an organization’s Capability Manual and operational documentation to provide a means for rapid certification or extension of certification.
Rules of Procedure –
Part 3-3: IECQ Approved Component Products,
Related Materials & Assemblies Scheme,
IECQ Approved Component – Capability Certification (IECQ AC-C)

1 Scope

1.1 General
This publication contains the Rules of Procedure of the Capability Certification of the IECQ, hereinafter referred to as the "Rules", for the Approved Component – Capability Certification (IECQ AC-C).

This IECQ Approved Component – Capability Certification Rules of Procedure provides the requirements specific to this category of the IECQ Approved Component scheme and is to be used in conjunction with applicable IECQ System management Basic Rules as listed in the normative references Clause 2 below, (IEC CA 01 + IECQ 01-S), General Rules of Procedures (IECQ 03-1), Approved Component Rules of Procedure (IECQ 03-3) and Operational Documents (ODs).

1.2 Application
Capability Approval is part of the previously operated schemes now incorporated in the IECQ 03-3 Approved Components scheme as IECQ Approved Component – Capability Certification. This Capability Certification (IECQ AC-C) procedure shall be used only when provided for in relevant specifications or standards (see 7.9 of this document for use in IECQ Capability Certification).

2 Normative references
The following publications contain provisions, which, through reference in this text, constitute provisions of these Rules. At the time of publication, the editions indicated were valid. The IECQ Management Committee shall decide the timetable for the introduction of revised editions of the publications.

IEC CA 01, IEC Conformity Assessment Systems – Basic Rules
IECQ 01-S, IECQ Supplement to IEC Conformity Assessment Systems – Basic Rules IEC CA 01
IECQ 02, General Requirements for the Acceptance of IECQ Certification Bodies into the IECQ System
IECQ 03-1, General Requirements for all IECQ Schemes
IECQ 03-3, IECQ Approved Component Products, Related Materials & Assemblies Scheme
ISO 9001, Quality management systems – Requirements
ISO/IEC 17000, Conformity assessment – Vocabulary and general principles
ISO/IEC 17021-1, Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 1: Requirements
ISO/IEC 17050-1, Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements
ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories
ISO/IEC 17065, Conformity assessment – Requirements for bodies certifying products, processes and services
3 Terms and Definitions

The basic definitions concerning conformity assessment contained in ISO/IEC 17000 apply.
For the purpose of all IECQ Schemes the terms and definitions given in IEC CA 01, IECQ 01-S, IECQ 02, IECQ 03-1 and the relevant IECQ 03-X Rules of Procedures along with the following apply.

3.1 Capability Approval

A term used to describe one of the approval types of the previously operated schemes, now IECQ Approved Component – Capability Certification.

3.2 IECQ AC – Capability Certification (IECQ AC-C)

A certification granted to an organization (manufacturer) when it has been established that their capability for manufacturing processes and quality control methods (including design aspects as applicable) covering a specific component technology, fulfils the requirements of the relevant specification or standard.

NOTE In the previously operated schemes this would be a generic specification.

3.3 Capability qualifying component (CQC)

A test specimen, which may be specially designed for this purpose, or taken from production, that is used for verifying capability in accordance with the relevant specification or standard.

3.4 Capability Manual

The Capability Manual is an expanded version of the Quality Plan Summary (Process Manual) as detailed in sub-clause 8.2.1 of IECQ 03-3. For Capability Certification under the IECQ Approved Component Scheme, this document is replaced by a Capability Manual, the form and content of which is detailed in 5.5.

3.5 Component(s)

An electronic device or range of electronic devices, related materials and assemblies that are the subject of IECQ Approved Component Certification

3.6 Incorporated components

Incorporated components are components that form the constituent parts of a larger, more complex, electronic component.

3.7 Ancillary part(s)

A part(s) without a distinctive electrical function in an electrical circuit e.g. such as a heat sink, thermal paste, insulators etc.

3.8 Rework

Rework is the rectification of processing errors prior to the release of the components by means not differing from those used in the current process or the rework processes as permitted by the specification.
3.9 Repair

Repair is the making usable of an approved component that has been damaged or has become defective after release.

4 Governing of the IECQ Scheme

As required by clause 4 of IECQ 03-3.

5 Principles of the IECQ AC – Capability Certification

5.1 IECQ AC – Capability Certification

Sub-clause 5 of IECQ 03-3 applies except as follows:

A component is eligible for IECQ AC-C in accordance with the Scheme if the manufacturing process, commencing not later than that manufacturing operation which is called the "primary stage" (see Annex C of IECQ 03-3) is carried out by one or more manufacturers approved in accordance with the requirements of IECQ 03-1 sub-clause 9.2.3 and under the direct supervision of the relevant Designated Management Representative (DMR) or local DMR.

5.2 In support of the previously operated scheme (CA);

Organizations that hold Capability Approval (CA) under the previously operated scheme and fulfil a) and b), are eligible to apply in the normal way for any additional product ranges.

a) The client must already hold certification under the previously operated scheme as a manufacturer who has been granted manufacturer's approval in accordance with the requirements of IECQ 03-1 including, as appropriate, those of ISO 9001 and, additionally, the requirements of this clause.

b) The client shall already hold Capability Approval (CA) under the previously operated scheme.

NOTE The Manufacturers Approval along with the Capability Approval certificates are currently being phased out – product certificates will then stand alone in accordance with the IECQ Approved Components scheme. Existing clients are therefore encouraged to transfer their Capability Approval across to Capability Certification under the IECQ AC Scheme.

5.3 Organization structure

The Organization (Client/Applicant/Certificate Holder).

5.3.1 Management responsibility

An organization shall have the responsibilities, specified in sub-clause 7.2.3 of IECQ 03-1 and the following:

5.4 IECQ AC Certification, Documentation Requirements

5.4.1 IECQ AC – Capability Certificate Content

The IECQ Approved Component – Capability Certificate as registered in the IECQ On-Line Certificate System shall have the listed content as detailed in sub-clause 7.1 of IECQ 03-3 and the following as a minimum:

- The organization's reference number for the Capability Manual, or other documentation defining the limits of the capability, on which the approval is based;
- Scope of Activity – Clear unambiguous general description for the technology or component to be covered by the IECQ AC-C Certification shall be provided in the “Details of Components/Assemblies/Materials" field on the certificate;
- Abstract of Capability – a clear unambiguous detailed abstract of the description of the capability (see 5.5.2.5), shall be attached as an “Attached Schedule of Scope” to the certificate utilizing the IECQ Templates.
5.5 Requirements for the form and content of a Capability Manual

5.5.1 General Requirements

5.5.1.1 Form of the Capability Manual

It is preferred that the documentation be prepared with each section beginning on a new page and with the section titles and their sequence as given in this document and Table 1 (see following page).

The document shall be given a document identity within the manufacturer's quality assurance system and have suitable provision for showing its issue and state of amendment.

The Capability Manual shall be raised in issue when a change is made. There shall be a means for recording that amendments have been incorporated and a means for summarizing the nature or purpose of the amendments. The initial and all subsequent issues shall be evaluated for acceptance by the CB and be countersigned.

5.5.1.2 Introductory pages

These shall include the following:

- Title page: "Capability Manual": " - - - The technology and specification to be noted here - - -". Document identity, date and Issue, manufacturer's name, telephone, fax numbers etc. Authorization by the DMR and a space for countersignature by the CB.

- Distribution list

- Amendment record (including amendment details)

- Contents list (sections as defined by the Table 1 below)

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5.5.2 Content Details

5.5.2.1 Scope of Capability Certification

This section shall include

a) a summary of those products covered by the relevant specification or standard for which capability is claimed,

b) the organization's policy for dealing with other electronic components which form an integral part of the finished component (see NOTE to 6.5.2.8.2),

c) claims additional to those prescribed in the specification,

d) assessment levels (where appropriate), and

e) screening levels (where appropriate).
5.5.2.2 Technology/range of components
The technology/range of components on which the capability is based shall be described. The
description shall make reference to the basic technology and identify the main distinguishing
features such as
- materials,
- manufacturing processes,
- finish/encapsulation,
- limiting geometries/design,
- application,
- limiting performance, and other features where appropriate.

5.5.2.3 Subcontracting
In this section the organization shall state whether or not any stages of manufacture in the
particular component technology, including design and processing, are subcontracted to
another facility. The statement shall define which of the cases a) to d) given in 6.2 apply.
The requirements of the generic and other relevant specifications shall be followed.

5.5.2.4 Limits of capability
This section shall include a complete list of the limits of capability for which the approval is
sought.

These limits represent the extent to which the organization exploits the limits defined in the
relevant specification (for example generic or sectional) or standard and will be the basis
against which the capability is to be assessed.

The factors that need to be considered when drafting this section, primarily concern the effect
on component performance imposed by the design, the limitations inherent in the materials and
manufacturing processes used.

Therefore the list of limiting features shall comprise
a) structural features covering the range of product and materials used, for example, in terms
   of maxima or minima (or both),

b) limiting mechanical performance. Where this varies over the range of product, for example,
   because of different structures or sizes, the change-over points should be identified,

c) limiting environmental performance. Where this varies over the range of product, for
   example, because of different methods of protection, the change-over points should be
   identified, and

d) limiting electrical performance, for example, voltage, frequency, according to the technology
   employed.

NOTE This list may be combined with the list of CQCs. See 5.5.2.11.1

5.5.2.5 Declaration of the capability
The declaration of capability (see 6.3) is a written declaration by the organization identifying
the scope and limits of their IECQ AC-C. It shall be written in accordance with the requirements
given in the specification (for example generic or sectional) or standard, for ultimate publication
in the On-Line Certificate Database, and a copy shall be included in this section of the Capability
Manual. Where a specification does not provide guidance on the contents of the description,
yhey shall consist of a concise statement of the scope and limits of the capability, stating the
technology, type and range of components covered and their environmental category.

To prevent any possible misunderstanding of the content of the description, the inclusion of the
following statement as part of the description may be considered useful: “It may not be possible
to achieve all the limits of the capability in combination. Such combinations are determined by
the agreed customer specification for the component ordered.”
5.5.2.6 Manufacturer to customer interface

In this section the organization shall describe the procedures by which it deals with a customer's orders. These procedures commence from the point at which an initial enquiry is received, through the point at which it is established that the customer's requirements for IECQ releases can be satisfied within the declared limits of their capability, to the point of production. It shall therefore cover such matters as the assistance given to the customer in preparing the customer's specification and the need (if any) for design confirmatory specimens.

5.5.2.7 Design rules, (when required, see 6.3)

In this section the organization should state their design rules and indicate their routine, which may be presented as a flow chart (see sub-clause 8.2.1 of IECQ 03-3), for the development of a design from the initial enquiry stage to the point at which the drawings and specification are sealed for production.

Although reference should be made to the organization’s own documentation covering the electrical aspects of design, the emphasis should be on those aspects that determine the durability and reliability of the component upon which the IECQ AC-C is based. For example, once outline factors such as housing and size have been decided as potentially suitable for the customer's application, the means of determining the mechanical, thermal, climatic and environmental aspects of the design should be made clear.

While it is acknowledged that much design work may be iterative in nature, it is suggested that this is shown as a step sequence or a chart, that considers the selection of ancillary parts and materials to be used in relation to their defined limits of performance and the appropriate factors of safety to be applied.

5.5.2.8 Materials list

This list shall include or reference all essential materials, components and bought in ancillary parts to be used in the construction of components for release under IECQ AC-C. The system used for appraising suppliers (Vendor Qualification Procedure) shall be stated. (A reference to internal procedures used is acceptable).

The list should preferably be given in a tabular form and show for each material/ancillary part the following information.

5.5.2.8.1 Raw materials
a) the specification references against which they are purchased
b) incoming goods inspection document references

5.5.2.8.2 Components/ancillary parts
a) the specification references against which they are purchased
b) incoming goods inspection document references

NOTE If the manufactured component incorporates other electronic components the procedures for the assessment of these components shall be stated and shall take account of the requirements for incorporated components given in 8.12.

5.5.2.9 Manufacture

5.5.2.9.1 Manufacturing Methods

A brief description of the range of facilities and control procedures (for example, Statistical Process Control) used in the production of the relevant components shall be given together with details of the technologies and limits claimed.

Where applicable, information should be given on methods for interconnection, assembly, encapsulation and finishes.

5.5.2.9.2 Process flow chart

Comprehensive flow chart(s) shall be given showing each process stage. At each stage, reference shall be made, as appropriate, to the relevant specification and process, process
control and quality assurance. Information feedback paths (for example, permitted rework loops) shall be shown.

5.5.2.9.3 Rework policy (see 7.10.1)
Under this heading the manufacturer shall state their policy concerning rework, and identify each feature for which rework would be permissible. This shall include the number of times rework may be carried out. Account shall be taken of any restrictions or prohibitions of rework activity given in the specification.

Permitted rework shall be indicated on the process flow chart together with references to such additional specifications as may be required to enable the rework to be undertaken. These specifications shall show how it is ensured that the reworked components meet all the original requirements and that the validity of inspection prior to reworking is retained.

5.5.2.10 Procedure in the event of CQC or product failure
The Capability Manual shall describe how the organization intends to satisfy the requirements of:

a) 7.1 in respect of the failure of CQCs during the demonstration and verification of capability,
b) 7.2 in respect of failure of CQCs during maintenance of IECQ AC-C, and
c) 7.3 in respect of persistent non-conformity with the specification

d) Particular attention shall be paid to the need for:
   i) a procedure for a clear analysis of the cause of failure in the case of a), b) and c) above,
   ii) the suspension of release under the Mark, or Certificate, of Conformity in the case of a), b) and c) above, and
   iii) the timely reporting to the IECQ CB of the failures and the corrective actions.

5.5.2.11 Test programme for IECQ AC-C
5.5.2.11.1 CQC specifications
The Capability Manual shall include or reference a specification for each CQC, in accordance with 7.9.2.

The CQCs, together with the processes and limits, they assess, should be listed. This list may conveniently be displayed in matrix form (see clause 8 of this document).

NOTE The limits of an organization's IECQ AC-C are assessed by means of CQCs. Where specimens are taken from production for this purpose, such components become in effect CQCs, and should be so treated by providing them with specifications appropriate to this purpose.

5.5.2.11.2 Total CQC test programme
The total CQC test programme to meet the requirements of 7.1 shall be prepared in accordance with the generic and other relevant specifications. It shall list the various CQCs together with the accept/reject criteria, grouping and sequences of tests. This may be shown as a schematic, tabular or matrix presentation.

5.5.2.12 Maintenance of IECQ AC-C
The organization shall document their approach to maintenance of IECQ AC-C, together with the means by which they intend the requirements contained in the generic and other relevant specifications to be met. This shall also make reference to and identify the CQCs being used.

The organization shall document their programme for maintenance that shall include limits of capability, the CQCs and the periodicity of tests covering the whole of the maintenance period.

One method of recording the CQC tests required for the maintenance of IECQ AC-C would be to prepare a matrix, one axis giving the CQC number and the other the process or limit that the CQC assesses. When a process or limit has been assessed the date of test and the test report number should be entered into the relevant cell.
5.5.2.13 Modifications to the IECQ AC-C
The manufacturer shall declare their procedures for controlling modifications to their established capability. This shall include their responsibility for notifying and agreeing with the CB their intended modification(s) and, where necessary, the formulation of a test programme to demonstrate the revised claimed limits or the continued validity of the certification. This section shall also detail the procedures for amending the Capability Manual and the description of the capability as appropriate.

5.5.2.14 Test methods and inspection
The Capability Manual shall describe or reference the organization’s process and test documentation, and shall address the following as applicable.

5.5.2.14.1 In process testing
a) critical process steps for the technology;
b) methods of implementing Statistical Process Control (SPC) when applicable;
c) methods used for analysing process drift and failures;
d) analysis of product variability;
e) corrective action procedures (to overcome potential causes of failure under c) and d) above.

5.5.2.14.2 Screening
Use of screening procedures appropriate to the technology.

5.5.2.14.3 Quality conformance inspection
Tests performed as a mandatory requirement for quality conformance inspection.

5.5.2.14.4 Reliability testing
Procedures for determining product reliability.

5.5.2.15 Register of product specifications covered by the IECQ AC-C
The Capability Manual shall include a reference to a register of customer specifications and standard catalogue item specifications covered by the organization’s IECQ AC-C.

6 IECQ AC Capability Certification procedure

6.1 General
IECQ AC-C assessments of an organization are based on the requirements of ISO 9001 and requirements within this document.

6.2 Application
When an approved organization wishes to obtain IECQ AC-C, they shall submit an application in writing to the IECQ CB. The application shall state the scope of the proposed IECQ AC-C, preferably in the form of a first draft of the information required under 6.3, and shall clearly define the range of technologies and/or the range of components the organization intends to manufacture in accordance with the stated specification (for example generic and/or sectional) or standard.

The organization shall also state

a) that it carries out at the approved location all the processes, tests, measurements, etc. subsequent to and including the primary stage of manufacture, or
b) that all stages of manufacture are carried out by manufacturers or companies approved within the IECQ System, some of whom may be located in other countries (see 8.12.2 of IECQ 03-3), or by distributors acting in another role (see IECQ 03-2, IECQ 03-2-1), or
c) that defined stages are subcontracted in accordance with sub-clause 8.12.4 and 8.12.5 of IECQ 03-3, or
d) that defined stages are carried out in one of the organization’s factories located in a non-IECQ member country, whereas the quality conformance testing may be performed either in a laboratory approved under the IECQ System, or, in the above mentioned factory which is under the direct surveillance of the CB (see 8.12.4 of IECQ 03-3), or, in a laboratory as described in sub-clause 8.12.9 of IECQ 03-3.

The above information shall form part of the Capability Manual a draft copy of which is required to be sent with the application. For the form and content of the Capability Manual see 5.5.

6.2.1 When the conditions of 6.2b) apply

The application for IECQ AC-C shall contain:

• details of the division of manufacturing stages between the manufacturers or specialist contractors concerned, and

• details of the arrangements agreed with the IECQ CB(s) involved for the certification of the quality of components, or partially manufactured components, when they are transferred from one approved manufacturer, specialist contractor or distributor acting in another role to another, together with details of the means whereby changes to the agreed arrangements are communicated to the responsible IECQ CB.

The IECQ CB of the organization seeking IECQ AC-C shall:

• co-ordinate the activities,

• seek confirmation from the IECQ CB(s) of the other countries that the information contained in the application is correct, and

• ensure that the organization possesses sufficient engineering capability and/or technical expertise to develop, maintain and control the manufacturing processes that it wishes to subcontract, or that the stages of manufacture concerned are adequately covered by a company’s existing Approved Processes under the IECQ System.

6.2.2 When conditions of 6.2c) apply

The application for IECQ AC-C shall contain:

• details of division of the manufacturing stages between the approved manufacturer and the subcontracting factory, and

• details of the arrangements agreed with the IECQ CB(s) involved for the certification of the quality of components taking into account the transfers during the manufacture and, in particular, the procedures for the assessment of quality of the subcontracted manufacturing stages, together with details of the means whereby changes to the agreed arrangements are communicated to the responsible IECQ CB.

The organization shall demonstrate to the IECQ CB by any suitable means that the quality of the final component will not be adversely affected by the use of these subcontracted stages of manufacture.

The IECQ CB of the organization seeking IECQ AC-C shall:

• ensure that the certified organization’s DMR is able to verify the satisfactory maintenance of the quality control procedures performed by their subcontractor in accordance with sub-clause 8.12.4 and 8.12.5 of IECQ 03-3, and

• ensure that the organization possesses sufficient engineering capability and/or technical expertise to develop, maintain and control the manufacturing processes that it wishes to subcontract, or that the stages of manufacture concerned are adequately covered by the specialist contractors’ existing approvals or certifications under the IECQ System.

The IECQ CB shall confirm in writing that the details contained in the application for IECQ AC-C satisfy the requirements of the IECQ System.

6.2.3 When the conditions of 6.2d) apply

The application for IECQ AC-C shall contain:

• details of the division of the manufacturing stages between the certified manufacturer and their factories located in a non-IECQ member country, and
• details of the arrangements agreed with the IECQ CB involved for the certification of the quality of the components taking into account the transfers carried out in the course of manufacture together with details of the means whereby changes to the agreed arrangements are communicated to the responsible IECQ CB.

The IECQ CB of the organization seeking IECQ AC-C shall:

• ensure that the DMR of the certified organization has effective responsibility for quality control procedures performed under the supervision of the local DMR on the production in a non-IECQ member country, and
• ensure that the organization possesses sufficient engineering capability and/or technical expertise to develop, maintain and control the manufacturing processes that it wishes to subcontract, or that the stages of manufacture concerned are adequately covered by the specialist contractors’ existing approvals or certifications under the IECQ System.

6.2.4 Notification to IECQ CB

When the organization's proposed declaration of capability meets the requirements of the specification and they are ready to demonstrate this capability, they shall give notice to the IECQ CB of their intention to start certification tests, and establish together with the IECQ CB a test plan and a time schedule for the execution of the certification tests.

6.3 Declaration of capability

The organization shall provide the IECQ CB with a description of their capability, relevant to the technologies and/or range of components for which the approval is being sought. Where confidential processes are involved the organization is only required to provide the information necessary for the IECQ AC-C.

The IECQ CB is not allowed to copy company confidential documents, to remove them from the organization’s premises, or to disclose without the organization’s prior permission such information to third parties (see also IECQ 03-1 clause 6)

The description of capability (which may be in the form of a Capability Manual) shall, either directly or by reference to the organization's internal documents:

a) define in accordance with the relevant specifications the scope and limits of the capability for which it is seeking approval;
b) state the design rules when required by the relevant specification or standard;
c) provide a description of the main features of construction of the component(s) (as applicable);
d) provide a process flow chart;
e) list the specifications or standards used for the CQCs and the materials and parts used;
f) list the specifications or standards for the inspection to be carried out during the manufacturing process;
g) define how modifications are notified.

The relevant specification (for example generic or sectional) or standard may give more detailed information concerning the description of capability to be supplied by the organization.

7 Demonstration and verification of capability

7.1 Programme

The DMR shall prepare a programme in accordance with the relevant specification for the assessment of the claimed capability. This programme shall include reference to:

a) the specification of the CQCs, and
b) the test and inspection requirements and/or process controls.
The tests shall be carried out by either the certified organization, an approved independent testing laboratory, an IECQ CB or, exceptionally, in accordance with the requirements specified in sub-clause 8.12.9 of IECQ 03-3.

7.2 CQC's
When the CQCs are designed and produced solely for the purpose of obtaining IECQ AC-C, the organization shall ensure that the same processes and inspection procedures are applied to normal production. The organization shall ensure that the CQCs collectively cover all of the defined limits of the capability (see 6.3 a)).

If during the initial IECQ AC-C demonstration a CQC sample fails to meet the specified requirements and exceeds the permitted number of failures, the manufacturer shall either:

c) amend the scope of their declared capability, or

d) conduct an investigation into the failure to establish its cause as being either a failure of the test itself, for example test equipment failure or operator error, or design or process failure.

7.3 CQC Test Failure
If, in b) above, the cause of failure is established as a failure of the test itself then, subject to the agreement of the IECQ CB, either the CQC which apparently failed or a new one, if appropriate, shall be returned to the test schedule after the necessary corrective action has been taken. If a new CQC is to be used, it shall be subjected to all of the tests in the given sequence of the test schedule(s) appropriate to the original CQC.

If, in b) above, the cause of failure is established as a design or process failure, a test programme agreed between the organization and the IECQ CB shall be performed to demonstrate that the cause of the failure has been eradicated and that all corrective measures have been carried out and documented (see 7.4). When this has been accomplished, the full test sequences shall be repeated using new CQCs.

7.4 Test Results
The results of the tests shall be recorded in an IECQ AC-C Report authenticated by the DMR and verified by the agreement (countersignature) of the IECQ CB that the IECQ AC-C Report meets the requirements of the specification. Any other reproduction and release of this report is the sole prerogative of the organization.

7.5 Completion (Granting of Certification)
Granting of Certification shall be conducted in accordance with sub-clause 9.7 of IECQ 03-1. IECQ AC-C shall be granted by the IECQ CB when the requirements of clauses 7.1 to 7.4 of this document have been met.

When IECQ AC-C is granted, a certificate is issued. The IECQ CB shall ensure that both the Scope of activity and the Abstract of Capability are clearly defined within the IECQ AC-C Online Certificate and its attachments (see 5.4.1), and that any printed copies of the certificates are printed with all pages including the Abstract of Capability.

7.6 Changes (Modifications)
Sub-clause 8.9.2 of this document applies. (see also sub-clause 8.2.1 of IECQ 03-3).

7.7 Release for delivery and validation of release
The organization shall be able to demonstrate to the IECQ CB that components released under the IECQ AC-C relate to the CQCs tested and lie within the declared capability (6.3).

A release for delivery is valid for five years unless a shorter period is specified in the specification or standard. The relevant specification or standard shall prescribe the tests that shall be repeated in order to revalidate the release.
7.8 Temporary restriction of release
If any aspect of an IECQ AC-C becomes deficient, the certification may continue with the agreement of the IECQ CB, provided that release of components is restricted to the remaining areas of the capability not affected by the deficiency, and that the deficiency is corrected within a period agreed between the organization and the IECQ CB. The relevant specification or standard may give more detailed information.

7.9 Specifications
In addition to the appropriate requirements of sub-clause 8.15 of IECQ 03-3 Standards and specifications for IECQ Approved Components, the following provisions shall apply.

The specification(s) shall prescribe how IECQ AC-C is to be implemented for a specific component technology. A description of the limits of capability relevant to the component technology shall be given. They shall specify the test schedules to be used in the capability test programme, maintenance of the IECQ AC-C, and quality conformance inspection and give information concerning the CQCs to be used. Where appropriate, they shall also define the requirements for add-on and/or incorporated components.

7.9.1 Specifications for Capability Qualifying Components (CQC)
Each CQC shall be covered by a specification (for printed boards referred to as Capability Specification), which shall provide all information against which the CQC shall be inspected and tested in accordance with the requirements of the specification.

7.9.2 Specifications for components for release
The specification shall comply with the specification (for example generic or sectional) or standard and, when read in conjunction with them, shall adequately describe the component. It shall also give the necessary information for quality conformance inspection.

The ownership rights of a specification or standard may be vested in the customer and/or manufacturer (Customer Specification) and the contents may be held by both to be confidential. In such instances this confidentiality shall be maintained by the IECQ CB (see also IECQ 03-1 clause 6).

When a component covered by the IECQ AC-C procedure is intended to be registered by the IECQ and listed in the On-Line Certificate Database, the manufacturer registering the specification shall

a) ensure that the specification is in accordance with the requirements (if any) for published specifications,
b) ensure that the requirements given in the Rules of Procedure for the registration of specifications are complied with, and
c) ensure that publication is not prohibited by ownership rights of the specification.

7.9.3 Register of Specifications
The component manufacturer shall maintain a register of all specifications associated with their IECQ AC-C. This register shall be available to the IECQ CB.

7.10 Rework and Repair
7.10.1 Rework
When necessary, the specification shall prohibit or restrict rework for all or for specific components and rework procedures shall be fully described in the relevant documentation produced by the organization.

All rework shall be carried out prior to the formation of the inspection lot offered for inspection to the requirements of the specification.

7.10.2 Repair
Components which have been repaired shall not be released under the IECQ System.
7.11 Use of IECQ Approved Process and subcontracting
Sub-clause 8.12 of IECQ 03-3 applies.

7.12 Incorporated Components

7.12.1 General requirements
Where components or assemblies manufactured and released under IECQ AC-C incorporate components other than ancillary parts, the requirements of 8.12.2, 8.12.3 and 8.12.4 of IECQ 03-3 shall apply.

NOTE The distinction between incorporated components and ancillary parts is that incorporated components have a distinctive electrical function in an electronic circuit, whereas ancillary parts (e.g.: a heat sink) do not.

7.12.2 Incorporated components covered by an applicable specification
Wherever possible, incorporated components shall be covered by an applicable specification or standard. Such components shall be procured using the normal IECQ release procedures. Under these conditions no other assessment of the components is required.

Where these components are not procured to an applicable specification, the IECQ AC-C certified organization's DMR shall verify their quality in accordance with 8.12.3 of IECQ 03-1.

7.12.3 The use of unapproved incorporated components
For the incorporation of unapproved components, the IECQ AC-C certified organization's DMR shall:

a) be satisfied that the quality and performance of the components are adequate for their purpose,
b) ensure the existence of a component specification covering all the aspects necessary to ensure their satisfactory performance as part of the final product,
c) carry out an adequate approval test programme maintaining a record of the results, and
d) institute sufficient "goods inward" inspection procedures to ensure continued satisfactory performance of the final product.

7.12.4 The incorporation of part finished components
Where part finished components are procured direct from a manufacturing source other than an IECQ Approved Process (see IECQ 03-2), the IECQ AC-C certified organization's DMR shall ensure that they comply with 8.12.2 and 8.12.3 of IECQ 03-3, and in addition ensure that:

a) the design of the part finished component is compatible with the assembly technique to be employed,
b) the assessment of quality and performance of the part finished component takes into account the assembly methods to be employed, and
c) adequate storage and handling facilities are available for the part finished component.

Any other technical requirements, specific to particular components, shall be specified in the specification, and these shall be considered as additional to the requirements of a), b) and c) above.
Annex A
(informative)

Example of a matrix

Example of a matrix showing capability limits and the CQCs used to prove them.

An example for Coaxial ferrite devices.

Assessment of the claimed capability is achieved by testing the required number of samples of each of the declared CQCs given in the following Table 2:

Table 2 - Matrix of capability limits and CQCs

<table>
<thead>
<tr>
<th>Limits</th>
<th>CQC</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Isolator (2-port)</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Circulator (3-port)</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating frequency extremes</td>
<td>0,5 GHz</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18 GHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>Broad</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Narrow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Power rating extremes</td>
<td>(Circulator only) Peak 2 000 W max.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean 100 W max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Isolator load</td>
<td>1 W</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mean power rating</td>
<td>15 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Storage temperature extremes</td>
<td>- 55 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ 100 °C</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Annex B
(Normative)
Flowchart for IECQ Capability Certification (AC-C)

Application for Capability Certification
IECQ 03-3 8.6 and 7.2

Check and confirm the Application
IECQ 03-3 8.2

Choice of Samples
IECQ 03-3 8.4

Test Schedule
IECQ 03-3 8.2 para 3

Perform Tests
IECQ 03-3 8.4

Capability Certification Test Report
IECQ 03-3 7.2

Requirements fulfilled?
(Validation of the AC-C Test Report by the CB)

Granting of Capability Certification
IECQ 03-1 9.7 and 8.5

Surveillance of Capability Certification
IECQ 03-3 8.6